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Panstrongylus diasi Pinto & Lent, 1946 (Hemiptera, Reduviidae, Triatominae): first record in Mato Grosso, Brazil

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Abstract

Panstrongylus diasi Pinto & Lent, 1946, previously known from throught the Brazilian center-west, is reported for the first time in Mato Grosso state, Brazil. We found 3 specimens, 1 of them from an urban area of Barra do Garças. The new record of *P. diasi* is important for the understanding of the epidemiology of Chagas disease, mainly because this species is found naturally infected with *Trypanosoma cruzi* (Chagas, 1909). Studies on the ecology, biogeography, and vector–host/parasite interactions of *P. diasi* are essential.

Key words

Chagas disease, ecology, new records, surveillance programs, *Trypanosoma cruzi*.

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Introduction

The blood-sucking insects of the subfamily Triatominae are vectors of Chagas disease, an infection caused by the protozoan *Trypanosoma cruzi* (Chagas, 1909). The subfamily is composed of 155 described species, assigned to 5 tribes and 19 genera (Souza et al. 2016, Justi and Galvão 2017, Rosa et al. 2017, Poinar-Jr 2019). The genus *Panstrongylus* Berg, 1879 was described based on *Panstrongylus guentheri* Berg, 1879, and has 15 species, 9 recorded in Brazil. In the state of Mato Grosso 4 species of this genus have been recorded: *P. megistus* (Burmeister, 1835), *P. geniculatus* (Latreille, 1811), *P. rufotuberculatus* (Champion, 1899), and *P. lignarius* (Walker, 1873) (Paula et al. 2013, Galvão 2014).

The genus *Panstrongylus* is important for public health because some species are associated with the transmission of *T. cruzi* to humans and other mammals. (Santos et al. 2003, Patterson et al. 2009). According to Maeda et al. (2012), among the 5 most collected triatomine species in the Federal District of Brazil, 3 belong to the genus *Panstrongylus: P. megistus, P. geniculatus*, and *P. diasi*.

Panstrongylus diasi has been reported in Brazil in the states of Bahia, Espírito Santo, Goiás, Maranhão, Mato Grosso do Sul, Minas Gerais, Rio Grande do Norte, São Paulo, and Tocantins and in the Distrito Federal (Sherlock and Serafim 1972, Rêbelo et al. 1998, Marassá and Barata 2000, Santos et al. 2004, Costa et al. 2003, Oliveira and Silva 2007, Almeida et al. 2008, Mendes et

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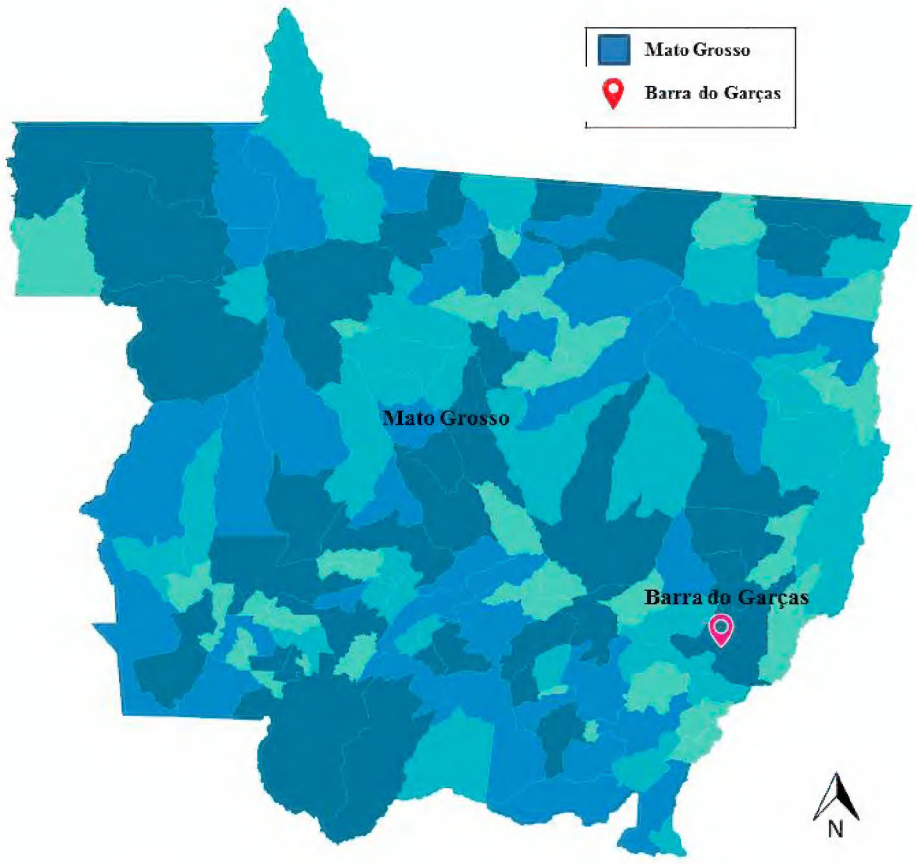

Figure 1. Municipality of Barra do Garças, Mato Grosso, Brazil. Source: "Instituto Brasileiro de Geografia e Estatística".

al. 2008, Maeda et al. 2012, Gil-Santana et al. 2014, Barreto et al. 2017). Here, we report the first record of this species in Mato Grosso.

Methods

Barra do Garças is a municipality, in Mato Grosso, with a population of over 56,000 inhabitants and a territorial area of 9079 km^2 (IBGE 2017). It is located on the banks of the Garças and Araguaia rivers and is an important area for tourism. The municipality is within the Cerrado biome, which is characterized by spatial heterogeneity and high endemism of plants and insects (Silva and Bates 2002, MMA 2002); the biome is a biodiversity hotspot. The climate is characterized by having 2 seasons (dry winter and rainy summer), corresponding to type Aw according to the Köppen classification (Köppen 1948); the average annual humidity is 60% and the annual averages of temperature range from 20 °C to 27 °C.

In 2011, during the routine work by the Chagas Disease Control Program of Environmental Health Surveillance, 2 specimens of triatomines were collect by hand by agents of endemic diseases in the rural settlements of Pontal do Araguaia, Mato Grosso, Brazil. The materials used were tweezers and lanterns to inspect shaded places. In 2017, a resident collected a third specimen, this time inside a dwelling in Barra do Garças (Fig. 1).

The 3 female specimens were studied at the Entomology Laboratory of the Escritório Regional de Saúde de Barra do Garças (ERSBG) of the Secretaria de Estado de Saúde de Mato Grosso, Brazil (SESMT), and identified as *P. diasi*. The identification was made using the dichotomous keys of Lent and Wygodzinsky (1979) and Galvão and Dale (2014).

The specimens were deposited in the Entomology Laboratory ERSBG/SESMT and in the Triatominae Collection at the Oswaldo Cruz Institute (CTIOC).

Results

New records. Brazil: Mato Grosso: Barra do Garças (15°51.98′ S, 052°16.29′ W, 395 m alt.), collected by Moraes SC, March 2017 (female total length 27 mm, CTIOC/9641; females, lengths 27 mm ERSBG/SESMT 053; female, total length 26.8 mm, ERSBG/SESMT 054 (Fig. 2). Brazil: Mato Grosso: Pontal do Araguaia (15° 40.72′ S, 052°00.55′ W, 370 m alt.), collected by agents of control of endemic diseases of Pontal do Araguaia, 2011.

Identification. For identification of this genus the main criteria is the position of the antennae, inserted close to the eyes (Fig. 3A). The species can be diagnosed as follows: anterolateral angles of pronotum very short; anterolateral margins of the pronotum forming a continuous line, almost straight (Fig. 3B, C); upper face of the head in lateral view straight; rostrum with second segment longer than first (Fig. 3D, E); femora with 2 or 3 denticles and scutellum process elongated, cylindrical and tapered at the apex (Fig. 3F, G) (Gurgel-Gonçalves et al. 2012b. Galvão and Dale 2014).

Figure 2. Female specimen of *Panstrongylus diasi* collected in Pontal do Araguaia (SESMT/ERSBG 053), Mato Grosso, Brazil in 2011.

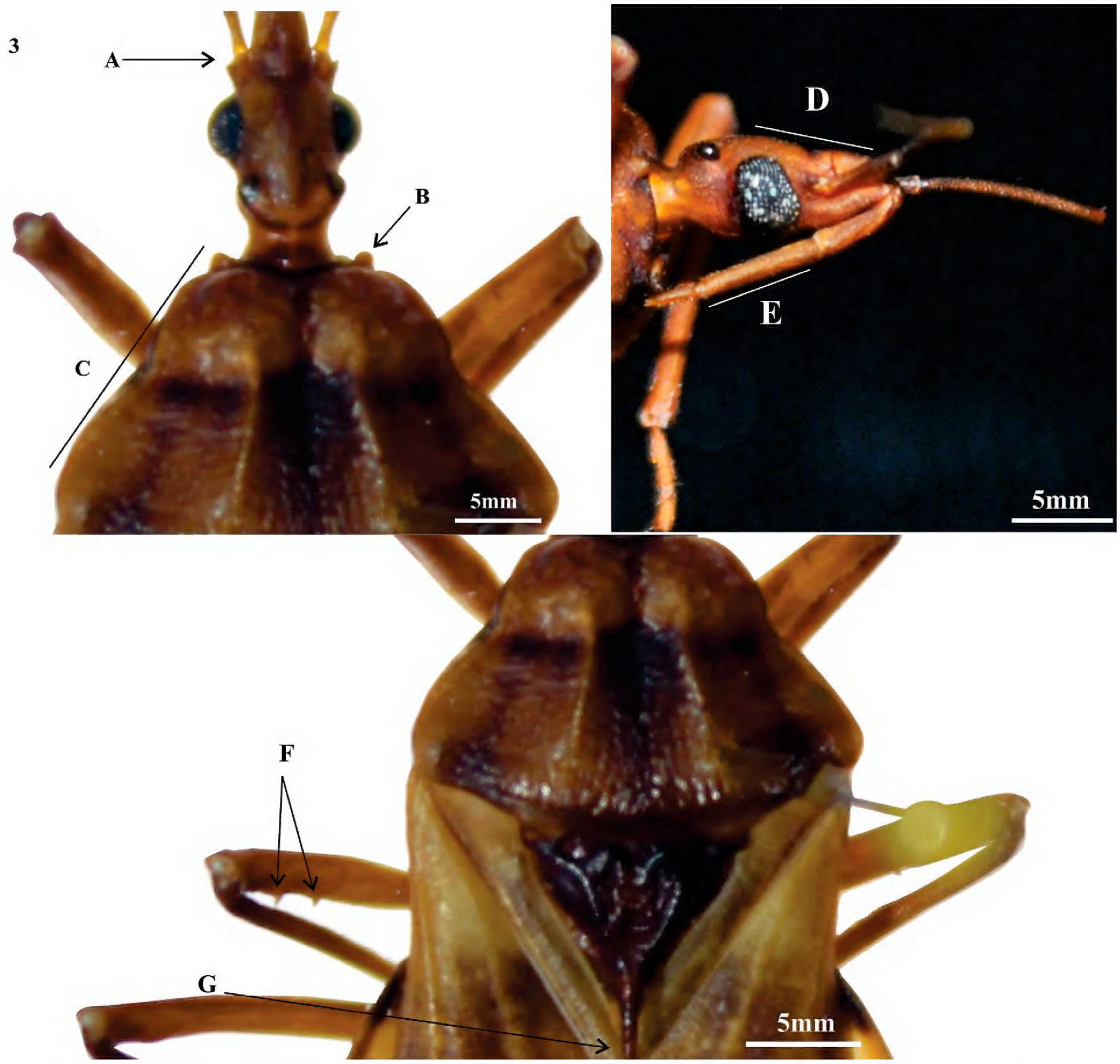

Figure 3. Main criteria for identification of *Pastrongylus diasi*: **A.** Antennal insertion, close to the eyes. **B.** Pronotum, anterolateral angles. **C.** Anterolateral margins in a continuous line. **D.** Upper face of straight head, lateral. **E.** Second segment of rostrum longer than the first. **F.** Femora with 2 denticles. **G.** Scutellum elongated and tapered.

Discussion

We extend the geographical distribution of *P. diasi* to Mato Grosso state. These new records are consistent with the prediction map for the potential distribution of this species in Brazil published by Gurgel-Gonçalves et al. (2012a) .

Lent and Wygodzinsky (1979: fig. 216) figured the type specimen of *P. diasi* with the indication that it was a female from Mato Grosso, Brazil. The legend is discordant with the labeling of the specimen, which is not from Mato Grosso. We examined the specimen deposited at CTIOC and can verify that it was collected in Minas Gerais (Fig. 4). A similar situation was detected by Gil-Santana and Galvão (2013), that recorded an apparent discordance between the labels attached to the holotype of *Parabelminus yurupucu* Lent & Wygodzinsky, 1979 in the CTIOC and the information published by Lent and Wygodzinsky (1979). The figure of the holotype by these authors confirms that it was this specimen type, not the paratype, which would have the information on the labels found with the holotype. Apparently, Lent and Wygodzinsky (1979) switched the information on the labels of the holotype and the paratype in their paper.

In Brazil, *P. diasi* was recorded in the states of Bahia, Espírito Santo, Goiás, Maranhão, Mato Grosso do Sul, Minas Gerais, Rio Grande do Norte, São Paulo, and Tocantins, as well as the Distrito Federal. This species is frequently collected in artificial habitats but the sylvatic habitats as well as aspects of its biology, ecology, and genetics remain unknown (Patterson et al. 2009, Galvão et al. 2014, Barreto et al. 2017). The 2 cities in Mato Grosso, where the new records were found are adjacent to the state of Goiás, where a record of *P. diasi* was collected in 2000 (Oliveira and Silva 2007).

Paula et al. (2010) and Brito et al. (2017) reported the natural infection of this species with *T. cruzi*. It is,

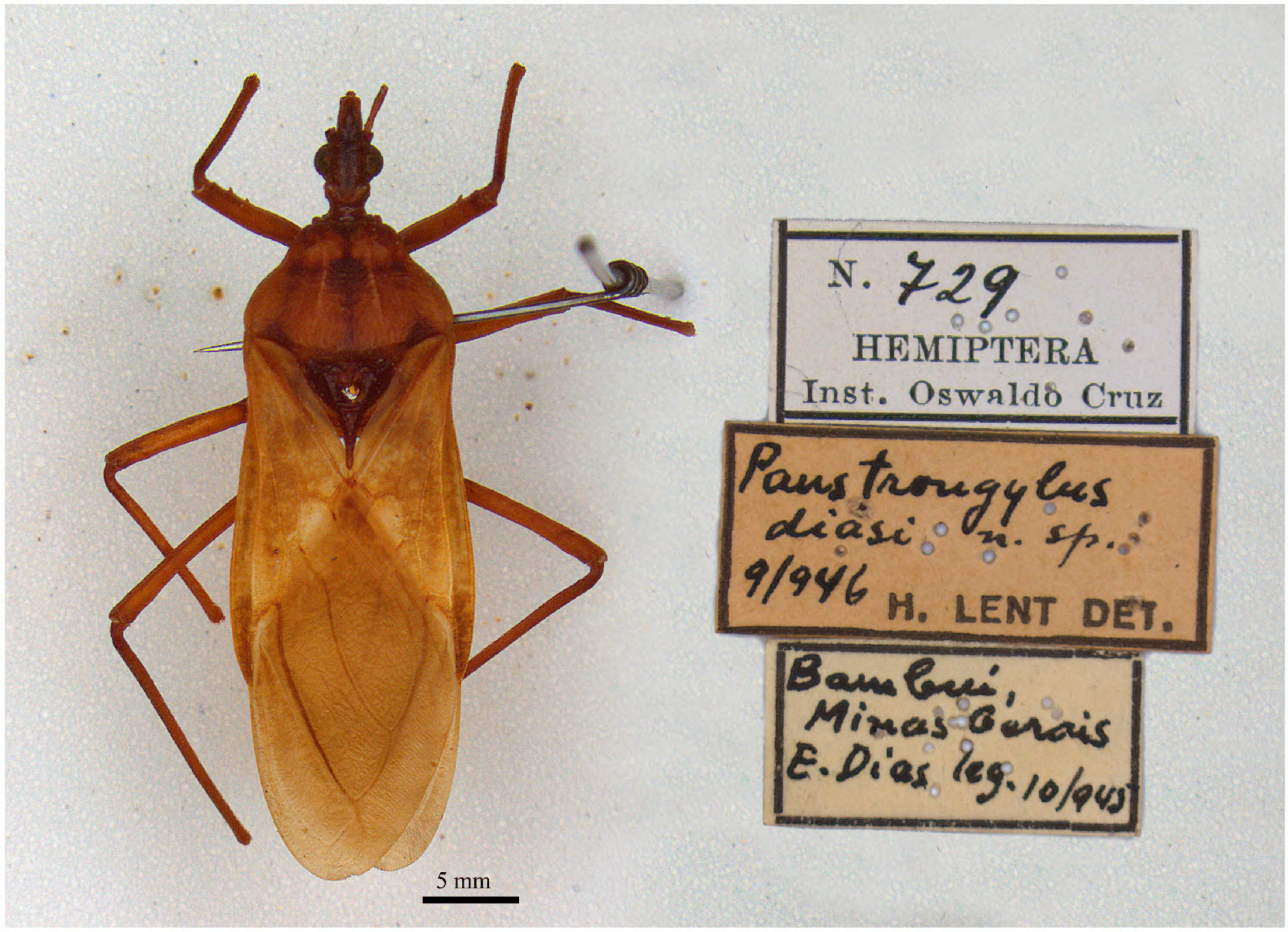

Figure 4. Type specimen and labels of a specimen of *P. diasi* deposited in the Triatominae Collection at the Oswaldo Cruz Institute (CTIOC), Rio de Janeiro, Brazil.

Figure 5. Panoramic view of Barra do Garças municipality, Mato Grosso, Parque Estadual da Serra Azul, Pontal do Araguaia (Mato Grosso) and Aragarças (Goiás), Brazil.

therefore, important to know the ecology, biogeography, and parasite/host interactions to propose effective interventions to reduce the risk of Chagas disease.

Barra do Garças has a different ecological context, given its proximity to the Parque Estadual da Serra Azul, which may facilitate the contact of sylvatic triatomines, potentially vectors of Chagas disease, with the human population (Fig. 5). The occurrence of sylvatic species that sporadically invade human dwellings are a major difficulty for vector surveillance programs (Caranha et al. 2011).

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Authors' Contributions

MCM conducted the fieldwork; MFM and OMT contributed to the preparation of the manuscript; GC studied the specimen and reviewed whole text.

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